
**Sustainability in buildings and civil
engineering works — Framework
for methods of assessment of the
environmental, social and economic
performance of construction
works as a basis for sustainability
assessment —**

**Part 1:
Buildings**

ISO 21931-1:2022

<https://standards.iteh.ai/> *Développement durable dans les bâtiments et les ouvrages de
génie civil — Cadre méthodologique de l'évaluation au sens du
développement durable des performances environnementales, sociales
et économiques des ouvrages de construction —*

Partie 1: Bâtiments



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 17, *Sustainability in buildings and civil engineering works*.

This second edition cancels and replaces the first edition (ISO 21931-1:2010), which has been technically revised.

The main changes are as follows:

- the scope has been expanded from a framework for methods of assessment of environmental performance to also include provisions related to methods for the assessment of economic and social performance of construction works, as an overall basis for sustainability assessment.

A list of all parts in the ISO 21931 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Buildings and constructed assets have an impact on sustainable development. Therefore, the internationally recognized Sustainable Development Goals (SDGs) formulated by the United Nations also apply to the construction and real estate industry. Amongst other things, the construction of sustainable and resilient buildings is required as part of targets towards sustainable cities and communities formulated in SDG 11. This goal is closely interrelated with the other SDGs. Both providers and buyers of real estate need clear characteristics and assessment criteria in order to evaluate, assess and communicate the contribution of buildings to sustainable development.

The provision and use of buildings in the sense of constructed shelters is a prerequisite for the residential sector, as well as for trade and industry. Buildings constitute both a living and working environment and affect the safety, comfort and performance of the user, as well as the quality of coexistence/life in a community. Aspects of urban integration and architectural design of buildings are important for the overall quality of the built environment: they can represent a cultural value. Buildings and constructed assets represent a high economic value both from a private, micro-economic and macro-economic point of view. Their construction and maintenance contribute to the preservation and creation of jobs, whereas the building-related negative effects on the environment contribute to external costs. The construction, use and maintenance of buildings are associated with significant energy and material flows, as well as adverse effects on the local and global environment. This includes health risks and risks to the environment. The type of design, construction and operation of buildings, together with the future construction of building stocks, have a great effect on sustainable development.

Against the background of climate change and the related SDG Goal 13 on Climate Action, and the importance of energy-saving, resource-saving, and healthy and cost-effective design, construction and management of buildings, there is a need for the creation of a basis for the assessment of environmental, social and economic performance; this is one purpose of this document. This document aims to bridge the gap between regional and national methods for the assessment of the environmental, social and economic performance of buildings, by providing a common framework for their expression. Practical, relevant rules and recommendations concerning methods for the assessment of the environmental, social and economic performance of buildings, which can exist on either a national or regional basis, can be examined and improved by the use of the framework of assessment, which is the basis of this document. Furthermore, general criteria for the determination and assessment of the environmental, social and economic performance of buildings are specified. These are derived from the areas of protection of sustainable development according to ISO 21929-1. The contribution of individual buildings to sustainable development can only be assessed if the technical and functional requirements are met and the results of the assessment of the environmental, social and economic performance are simultaneously and equally weighted.

Life-cycle-based approaches play an increasingly significant role for setting performance criteria within methods of assessment of environmental, social and economic performance of buildings. However, methods of assessment of the environmental, economic and social performance of buildings need to refer to limited criteria and seek a balance between rigour and practicality.

Target conflicts can occur when attempting to plan environmentally- and health-friendly buildings, which are characterized by a high user acceptance and are at the same time economically advantageous. These target conflicts can be identified through the combined analysis of ecological, social and economic aspects. Already in the planning phase, the consequences of decisions on the energy and material flows with resulting environmental impacts, on the life cycle costs as well as on the social performance can be identified and influenced. The effects of decisions on the size and shape, the construction method, the choice of materials or the energy sources, among others, can be analysed.

The subject of this document is the building on its site (curtilage) throughout its life cycle. This document can be used to support planning and decision-making for new constructions and refurbishment actions. This particularly affects the comparison of variants, the provision of information for sustainability assessment and certification systems, as well as the provision of information for funders, valuers, facility and portfolio managers, risk analysts and others.

Such assessments can also be used for benchmarking performance and monitoring progress towards improvement of performance; their communication provides a basis for demonstrating and communicating the result of efforts to improve environmental, social and economic performance in construction works.

This document aims at builders, planners and developers of sustainability assessment systems for individual buildings.

This document is one of a suite of documents dealing with sustainability in building construction, which includes ISO 21929-1, ISO 21930 and ISO 15392, along with the terminology of sustainability in building construction (ISO/TR 21932). The relationship among the documents is illustrated in [Figure 1](#).

ISO/TC59/SC17	Environmental aspects	Social aspects	Economic aspects	Technical aspects	Functional aspects
Principles	ISO 15392 General principles				
	ISO/TS 12720 Guidelines on the application of ISO 15392				
	ISO/TR 21932 A review of terminology				
Buildings (Parts 1) + Civil engineering works, CEW (Parts 2)	ISO 21929-1 Framework for the development of indicators – Part 1: Buildings				
	ISO 21929-2 Framework for the development of indicators – Part 2: CEW				
	ISO 21931-1 Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment – Part 1: Buildings				
	ISO 21931-2 Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment – Part 2: Civil engineering works				
	ISO 20887 Design for disassembly and adaptability – Principles, requirements and guidance				
	ISO 16745-1+ 2 Carbon metric of an existing building during use stage – Part 1: Calculation, reporting, communication. – Part 2: Verification				
	ISO 21678 Indicators and benchmarks – Principles, requirements and guidelines				
Products	ISO 22057 Data templates for the use of environmental product declarations (EPDs) for construction products in building information modelling (BIM)				
	ISO 21930 Core rules for environmental product declarations of construction products and services				

Figure 1 — Suite of related documents for sustainability

Sustainability in buildings and civil engineering works — Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment —

Part 1: Buildings

1 Scope

This document provides a general framework for improving the quality and comparability of methods for assessing the environmental, social and economic performance of construction works, and their combination as a basis for the sustainability assessment of buildings.

It identifies and describes issues to be taken into account in the development and use of methods of assessment of the environmental, social and economic characteristics, aspects and impacts of new or existing buildings. These relate to the building's design, production of construction products, materials and components, construction, operation, maintenance and refurbishment and end-of-life processes.

This document is applicable to the assessment of the building (or part thereof) and the external works within its site (curtilage).

NOTE The assessment of environmental, social and economic aspects related to the location of the building, such as those resulting from transportation of the users, can extend beyond the area of the building site.

This document does not set benchmarks or levels of performance relative to environmental, social and economic impacts and aspects.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6707-1, *Buildings and civil engineering works — Vocabulary — Part 1: General terms*

ISO 6707-2, *Buildings and civil engineering works — Vocabulary — Part 2: Contract and communication terms*

ISO 14050, *Environmental management — Vocabulary*

ISO 15686-1, *Buildings and constructed assets — Service life planning — Part 1: General principles and framework*

ISO 15686-2, *Buildings and constructed assets — Service life planning — Part 2: Service life prediction procedures*

ISO 15686-5, *Buildings and constructed assets — Service life planning — Part 5: Life-cycle costing*

ISO 15686-7, *Buildings and constructed assets — Service life planning — Part 7: Performance evaluation for feedback of service life data from practice*

ISO 21931-1:2022(E)

ISO 15686-8, *Buildings and constructed assets — Service-life planning — Part 8: Reference service life and service-life estimation*

ISO 21678, *Sustainability in buildings and civil engineering works — Indicators and benchmarks — Principles, requirements and guidelines*

ISO 21930:2017, *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services*

ISO/TR 21932, *Sustainability in buildings and civil engineering works — A review of terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO 6707-2, ISO 14050, ISO/TR 21932 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

NOTE Several of the listings below include terminology data from ISO 6707-1 and ISO 6707-2 for convenience and direct reference.

3.1 Terms relating to construction works and construction products

3.1.1 building

construction works (3.1.7) that has the provision of shelter for its occupants or contents as one of its main purposes, usually partially or totally enclosed and designed to stand permanently in one place

[SOURCE: ISO 6707-1:2020, 3.1.1.3, modified — Note 1 to entry has been removed.]

3.1.2 component

item manufactured as a distinct unit to serve a specific function or functions

Note 1 to entry: A building component is a part of a *building* (3.1.1), fulfilling specific requirements/functions (e.g. a window or a heating system). The *service life* (3.1.13) of a building component can be shorter than the full service life of the building. Building components are sometimes referred to as "building elements".

Note 2 to entry: A product component is a part of a complex *construction product* (3.1.6), for example a seal of a window or a burner as part of a heating system, fulfilling specific requirements/functions. The service life of a product component can be shorter than the service life of the of the building or building element or the "complex" construction product.

[SOURCE: ISO 6707-1:2020, 3.4.1.3, modified — the reference to "product" has been replaced by "item" and two notes to entry have been added.]

3.1.3 assembly

set of related *components* (3.1.2) attached to each other

[SOURCE: ISO 6707-1:2020, 3.3.5.5]

3.1.4 brief

program, US
document that states the requirements for a project

[SOURCE: ISO 6707-2:2017, 3.2.18]

3.1.5**client**

person or organization initiating and financing a project and approving the *brief* (3.1.4)

[SOURCE: ISO 6707-2:2017, 3.8.2]

3.1.6**construction product**

item manufactured or processed for incorporation in a *building* (3.1.1)

Note 1 to entry: Construction products are items supplied by a single responsible body.

Note 2 to entry: In this document, unless otherwise designated, the term construction product is used for any good(s) or service(s) related to a building.

Note 3 to entry: *Assemblies* (3.1.3), construction elements and integrated technical systems, incorporated within the building can be considered construction products.

[SOURCE: ISO 21930:2017, 3.2.2, modified — The references to "construction works" have been replaced with "building(s)"; the reference to "construction assemblies" has been replaced with "assemblies".]

3.1.7**construction works**

construction, US

everything that is constructed or results from construction operations

[SOURCE: ISO 6707-1:2020, 3.1.1.1, modified — Two notes to entry have been removed.]

3.1.8**constructed asset**

anything of value that is constructed or results from construction operations

[SOURCE: ISO 20887:2020, 3.8]

3.1.9**design life**

service life (3.1.13) intended by the designer

Note 1 to entry: As stated by the designer to the client to support specification decisions.

[SOURCE: ISO 15686-1:2011, 3.3, modified — The abbreviated term and the deprecated terms have been removed.]

3.1.10**estimated service life**

service life (3.1.13) that a *building* (3.1.1) or parts of a building would be expected to have in a set of specific in-use conditions, determined from reference service life data after taking into account any differences from the reference in-use conditions

Note 1 to entry: The estimated service life is considered in the calculation of replacements at both the *construction product* (3.1.6) level and building level (B4) and refurbishment (B5) (see 5.4.2.3).

[SOURCE: ISO 15686-1:2011, 3.7, modified — The abbreviated term has been removed; Note 1 to entry has been added.]

3.1.11**required service life**

service life (3.1.13) required by the client or through regulations

Note 1 to entry: The required service life is considered in the calculation of replacements at both the *construction product* (3.1.6) level and *building* (3.1.1) level (B4) and refurbishment (B5) (see 5.4.2.3).

[SOURCE: ISO 21930:2017, 3.2.14, modified — The reference to "construction works" has been replaced with "building".]

3.1.12

resilience

ability to resist, adapt to, or quickly recover from potentially disruptive events or conditions, whether natural or anthropogenic, in order to maintain or restore the intended service

3.1.13

service life

period of time after installation during which a *building* (3.1.1) or its component parts meet or exceed the *performance* (3.2.1) requirements

[SOURCE: ISO 15686-1:2011, 3.25, modified — The reference to "facility" has been replaced with "building".]

3.1.14

sustainable development

development that meets the environmental, social and economic needs of the present without compromising the ability of future generations to meet their own needs

[SOURCE: ISO Guide 82:2019, 3.2, modified — Note 1 to entry has been removed.]

3.1.15

disassembly

non-destructive taking-apart of a *construction works* (3.1.7) or *constructed asset* (3.1.8) into constituent materials or *components* (3.1.2)

Note 1 to entry: This *process* (3.3.17) can be applied to a *construction product* (3.1.6), system, component, or *assembly* (3.1.3).

[SOURCE: ISO 20887:2020, 3.12, modified — In Note 1 to entry, the reference to "product" has been replaced with "construction product"; the reference to "module" has been removed.]

3.1.16

adaptability

ability to be changed or modified to make suitable for a particular purpose

[SOURCE: ISO 6707-1:2020, 3.7.3.79]

3.1.17

convertibility

ability to accommodate a substantial change(s) in user needs by making modifications

[SOURCE: ISO 20887:2020, 3.10]

3.1.18

expandability

ability of a design or the characteristic of a system to accommodate a substantial change that supports or facilitates the addition of new space, features, capabilities and capacities

Note 1 to entry: Expandability is a form of scalability. Similarly, contraction can also be a beneficial capability that is a form of scalability.

[SOURCE: ISO 20887:2020, 3.16]

3.1.19

versatility

flexibility

ability to accommodate different functions with minor system changes

[SOURCE: ISO 20887:2020, 3.40, modified — The admitted term "flexibility" has been added.]

3.1.20**repair**

returning a *construction product* (3.1.6) or *component* (3.1.2) to an acceptable condition through the renewal, *replacement*, (3.1.21) or mending of worn, damaged, or degraded parts

[SOURCE: ISO 6707-1:2020, 3.5.1.47, modified — The reference to “item” has been replaced by a reference to “construction product or component.”]

3.1.21**replacement**

substitution of a *construction product* (3.1.6) or *component* (3.1.2) with one having identical characteristics

3.1.22**refurbishment**

modification to a *building* (3.1.1) or *component* (3.1.2) in order to bring it up to an improved condition

Note 1 to entry: Refurbishment can include, for example, *retrofit* (3.1.23), *remodelling* (3.1.24), modernization, repurposing and the improvement of technical and functional performance.

3.1.23**retrofit**

modification of an entity or system using parts developed or made available after the time of original manufacture or by other means with the objective of improving functionality

[SOURCE: ISO 6707-4:2021, 3.5.27]

3.1.24**remodelling**

changing the structure or function of a *building* (3.1.1)

3.2 Terms relating to performance**3.2.1****performance**

observed (or predicted) in-use behaviour of a *building* (3.1.1) in fulfilling (to fulfil) required functions under intended use conditions

Note 1 to entry: Behaviour in this context pertains to functional and technical requirements in use.

[SOURCE: ISO 15392:2019, 3.20, modified — The expression “in-use” has been added; the reference to “construction works, construction product or construction service” has been replaced with “building”; in Note 1 to entry, the reference to “performance” has been replaced with “behaviour”.]

3.2.2**functional equivalent**

quantified functional requirements and/or technical requirements for a *building* (3.1.1) for use as a reference basis for comparison

3.2.3**economic aspect**

characteristic of a *building* (3.1.1), part(s) of a building, *processes* (3.3.17) or services related to its *life cycle* (3.3.1) that can cause a change to cost and/or economic value

[SOURCE: ISO 15392:2019, 3.12, modified — The references to “construction works” have been replaced with “building” in the singular; the reference to “economic conditions” has been replaced with “cost and/or economic value”.]

3.2.4

economic impact

<mid-point assessment> change to the economy, whether adverse or beneficial, wholly or partially resulting from *economic aspects* (3.2.3)

Note 1 to entry: Derived from the definitions of "impact" and "economic impact" in ISO 15392 and delimited to a *life cycle costing* (3.3.4) method focussed on mid-points.

3.2.5

economic impact

<end-point assessment> result of a change to the economy, whether adverse or beneficial, wholly or partially resulting from *economic aspects* (3.2.3)

Note 1 to entry: Derived from the definitions of "impact" and "economic impact" in ISO 15392 and delimited to a *life cycle costing* (3.3.4) method focussed on end-points.

3.2.6

economic performance

performance (3.2.1) of a *building* (3.1.1) relating to its *economic aspects* (3.2.3) and *economic impacts* (3.2.4) (3.2.5)

3.2.7

environmental aspect

characteristic of a *building* (3.1.1), part(s) of a building, *processes* (3.3.17) or services related to its *life cycle* (3.3.1) that can cause a change to the *environment* (3.3.20)

[SOURCE: ISO 15392:2019, 3.13, modified — The references to "construction works" have been replaced with "building" in the singular.]

3.2.8

environmental impact

<mid-point assessment> change to the *environment* (3.3.20), whether adverse or beneficial, wholly or partially resulting from *environmental aspects* (3.2.7)

Note 1 to entry: Derived from the definitions of "impact" and "environmental impact" in ISO 15392 and delimited to LCIA (life cycle impact assessment) methods focussed on mid-points.

3.2.9

environmental impact

<end-point assessment> result of a change to the *environment* (3.3.20), whether adverse or beneficial, wholly or partially resulting from *environmental aspects* (3.2.7)

Note 1 to entry: Derived from the definitions of "impact" and "environmental impact" in ISO 15392 and delimited to LCIA (life cycle impact assessment) methods focussed on end-points.

3.2.10

environmental performance

performance (3.2.1) of a *building* (3.1.1) related to its *environmental aspects* (3.2.7) and *environmental impacts* (3.2.8) (3.2.9)

Note 1 to entry: The environmental performance is influenced by all *processes* (3.3.17) related to the *life cycle* (3.3.1) of the building.

Note 2 to entry: Environmental performance can be expressed either quantitatively or qualitatively with reference to *performance requirements* (ISO 6707-1:2020, 3.7.1.12) or possibly relative to a scale of values or a *benchmark* (3.2.16).

Note 3 to entry: Module D also shows additional supplementary information regarding environmental performance (potential environmental impacts and aspects) related to the energy and mass flows beyond the *system boundary* (3.3.12).

[SOURCE: ISO 15392:2019, 3.16, modified — The references to "building" and Notes 2 and 3 to entry have been added.]

3.2.11**social aspect**

characteristic of a *building* (3.1.1), part(s) of a building, *processes* (3.3.17) or services related to its *life cycle* (3.3.1) that can cause a change to society or quality of life

[SOURCE: ISO 15392:2019, 3.14, modified — The references to "construction works" have been replaced with "building" in the singular.]

3.2.12**social impact**

<mid-point assessment> change to society or quality of life, whether adverse or beneficial, wholly or partially resulting from *social aspects* (3.2.11)

Note 1 to entry: Derived from the definitions of "impact" and "social impact" in ISO 15392 and delimited to assessment methods focussed on mid-points.

3.2.13**social impact**

<end-point assessment> result of a change to society or quality of life, whether adverse or beneficial, wholly or partially resulting from *social aspects* (3.2.11)

Note 1 to entry: Derived from the definitions of "impact" and "social impact" in ISO 15392 and delimited to assessment methods focussed on end-points.

3.2.14**social performance**

performance (3.2.1) of a *building* (3.1.1) relating to its *social aspects* (3.2.11) and *social impacts* (3.2.12) (3.2.13)

3.2.15**benchmarking**

process (3.3.17) of collecting, analysing and relating *performance* (3.2.1) data of comparable *buildings* (3.1.1) or other types of *construction works* (3.1.7)

Note 1 to entry: Benchmarking is typically used for evaluating and comparing performance between or within objects of consideration.

[SOURCE: ISO 21678:2020, 3.1]

3.2.16**benchmark**

reference point against which comparisons can be made

[SOURCE: ISO 21678:2020, 3.2]

3.3 Terms relating to life cycle approaches**3.3.1****life cycle**

all consecutive and interlinked stages in the life of the object under consideration

Note 1 to entry: For consideration of *environmental impacts* (3.2.8) (3.2.9) and *environmental aspects* (3.2.7), the life cycle comprises all stages, from raw material acquisition or generation of natural resources to end-of-life.

Note 2 to entry: For consideration of *economic impacts* (3.2.4) (3.2.5) and *economic aspects* (3.2.3), in terms of costs, the life cycle comprises all stages from pre-construction to end-of-life.

Note 3 to entry: For consideration of *social impacts* (3.2.12) (3.2.13) and *social aspects* (3.2.9) of the life cycle, it comprises all stages from pre-construction to end-of-life.